

PCT

WORLD INTELLECTUAL PROPERTY ORGANIZATION
International Bureau

NO. 485 P0037020



INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification 5 :

E04H 1/00

A1

(11) International Publication Number:

WO 93/18250

(43) International Publication Date: 16 September 1993 (16.09.93)

(21) International Application Number: PCT/US93/01937

(22) International Filing Date: 2 March 1993 (02.03.93)

(30) Priority data:

07/846,608

5 March 1992 (05.03.92)

US

(71)(72) Applicant and Inventor: BOCKMILLER, Douglas, F.
[US/US]: 5601 Balmoral Drive, Oakland, CA 94619
(US).(74) Agent: LAMPE, Thomas, R.; Bielen, Peterson & Lampe,
1990 California Blvd., Suite 720, Walnut Creek, CA
94596 (US).(81) Designated States: AU, BB, BG, BR, CA, FI, HU, JP, KP,
KR, LK, MG, MN, MW, NO, NZ, PL, RO, RU, SD, Eu-
ropean patent (AT, BE, CH, DE, DK, ES, FR, GB, GR,
IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF,
CG, CI, CM, GA, GN, ML, MR, SN, TD, TG).

Published

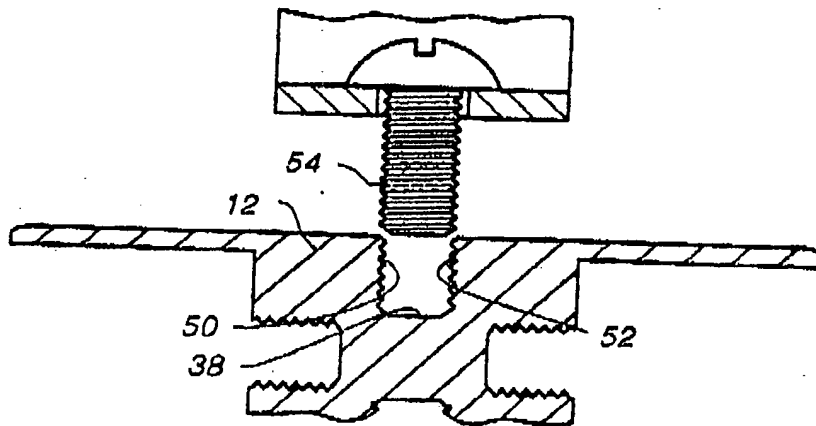
With international search report.

J1017 U.S. PRO

09/875303

06/06/01

(54) Title: WALL ASSEMBLY SUPPORT APPARATUS



BEST AVAILABLE COPY

(57) Abstract

Support apparatus including a framing member (12) for supporting at least one panel (14) of a wall assembly and for supporting a structural member (54) projecting outwardly from the framing member and the panel.

FOR THE PURPOSES OF INFORMATION ONLY

Codes used to identify States party to the PCT on the front pages of pamphlets publishing international applications under the PCT.

AT	Austria	FR	France	MR	Mauritania
AU	Australia	GA	Gabon	MW	Malawi
BB	Barbados	GB	United Kingdom	NL	Netherlands
BE	Belgium	GN	Guinea	NO	Norway
BF	Burkina Faso	GR	Greece	NZ	New Zealand
BG	Bulgaria	HU	Hungary	PL	Poland
BJ	Benin	IE	Ireland	PT	Portugal
BR	Brazil	IT	Italy	RO	Romania
CA	Canada	JP	Japan	RU	Russian Federation
CF	Central African Republic	KP	Democratic People's Republic of Korea	SD	Sudan
CG	Congo	KR	Republic of Korea	SE	Sweden
CH	Switzerland	KZ	Kazakhstan	SK	Slovak Republic
CI	Côte d'Ivoire	LJ	Liechtenstein	SN	Senegal
CM	Cameroon	LK	Sri Lanka	SU	Soviet Union
CS	Czechoslovakia	LU	Luxembourg	TD	Chad
CZ	Czech Republic	MC	Monaco	TG	Togo
DE	Germany	MG	Madagascar	UA	Ukraine
DK	Denmark	MI	Mali	US	United States of America
ES	Spain	MN	Mongolia	VN	Viet Nam
FI	Finland				

WALL ASSEMBLY SUPPORT APPARATUS

TECHNICAL FIELD

This invention relates to a channel wall system of the type employed, for example, in clean rooms. More particularly, the invention pertains to support apparatus including a framing member for supporting at least one panel of a wall assembly and for supporting a structural member projecting outwardly from the framing member and the panel.

BACKGROUND ART

U.S. Patent No. 4,984,400, issued January 15, 1991, is directed to a clean room channel wall system. The system includes extruded framing members which are operable to join wall and other panels of the wall system and support them.

While the wall system disclosed in U.S. Patent No. 4,984,400 has met with widespread commercial success, the system as disclosed has a limitation. Namely, it does not provide or allow for support of structural members, such as shelves, tabletops, seats and the like, from the "clean side" of the wall.

DISCLOSURE OF INVENTION

The wall system of the present invention incorporates support apparatus including a framing member for supporting at least one panel of a wall assembly and for supporting a structural member projecting outwardly from the framing member and the panel. The support apparatus is of relatively simple, inexpensive construction, and provides a means whereby the wall system may be quickly and efficiently assembled and disassembled. The framing members utilized in the support apparatus are of a construction which provide for the ready attachment and detachment of structural

members, such as shelving, seating and tabletops, relative thereto while maintaining a clean environment.

The framing member of the present invention includes an elongated body having a front panel and pair of legs opposed to one another and having distal ends spaced from the front panel and defining a channel.

At least one elongated panel support flange is integrally connected to the elongated body and contiguous with the front panel. The elongated body defines an elongated opening in the front panel and further defines an elongated recess in at least partial registry with the elongated opening and communicating with the elongated opening.

The elongated opening and the elongated recess extend a substantial length along the elongated body and are for receiving and accommodating attachment means, whereby the structural member may be attached to the framing member at a preselected location of a plurality of locations along the elongated body.

The attachment means is a mechanical fastener selectively attachable to the elongated body and selectively detachable from the elongated body. A number of elongated recess configurations and mechanical fasteners for operative association therewith are disclosed herein.

Other features, advantages, and objects of the present invention will become apparent with reference to the following description and accompanying drawings.

BRIEF DESCRIPTION OF DRAWINGS

Fig. 1 is a pictorial view of a clean room wall system incorporating the present invention;

Fig. 2 is an enlarged, cross-sectional view of a framing member constructed in accordance with the teachings of the present invention;

Fig. 2A is a greatly enlarged, fragmentary view of a portion of the framing member in Fig. 2 and a mechanical fastener to be operatively associated therewith;

Fig. 3 is an enlarged, cross-sectional view of an alternate form of framing member and mechanical fastener;

Fig. 4 is an enlarged cross-sectional view of yet another form of framing member and mechanical fastener;

Fig. 5 is an enlarged cross-sectional view of still another form of framing member and mechanical fastener;

Fig. 6 is an enlarged, cross-sectional view of another embodiment of framing member and mechanical fastener;

Fig. 6A is an enlarged, fragmentary, cross-sectional view of the Fig. 6 embodiment;

Fig. 6B is a greatly enlarged, perspective view of the Fig. 6 embodiment;

Fig. 7 is a cross-sectional view of an inside corner framing member incorporating the teachings of the present invention;

Fig. 8 is a cross-sectional view of an outside corner framing member incorporating the teachings of the present invention; and

Fig. 9 is a cross-sectional view of a fitting which may be incorporated with the framing member shown in Fig. 2.

MODES FOR CARRYING OUT THE INVENTION

Referring now to Fig. 1, a wall system 10 utilizing the apparatus of the present invention is illustrated. The wall system extends upwardly from a floor 12 and includes a plurality of interconnected framing members supporting and holding wall assembly panels such as wall panels 14. U.S. Patent No. 4,984,400, noted above, may be referred to for specific operational details of a wall system of this general type.

Utilizing the teachings of the present invention, the wall system may be utilized to support structural members such as shelf 18 therefrom.

Figs. 2, 2A disclose a preferred embodiment of framing member 12. Framing member 12 is generally of the type disclosed in U.S. Patent No. 4,984,400 and its construction and operation need not be described in detail. Suffice it to say that framing member 12 includes an elongated body 20 having a front body panel 22. A pair of legs 24, 26 are also incorporated in the elongated body. Legs 24, 26 are opposed to one another, incorporate distal ends spaced from the front body panel, and define a channel 28.

A pair of elongated panel support flanges 32, 34 are integrally connected to the elongated body and contiguous with the front body panel.

The elongated body 20 defines an elongated opening 36 in the front body panel and further defines an elongated recess 38 leading inwardly from elongated opening 36.

The elongated opening 36 and the elongated recess 38 extend along the length of the elongated body 20.

The opening and recess are for the purpose of receiving and accommodating attachment means whereby a structural member, such as shelf 18, may be attached to the framing member at a preselected location of a plurality of locations along the elongated body, and accept a snap-on cover to ensure cleanliness.

Framing member 12 also defines a second elongated recess 40 communicating with channel 28, but the second elongated recess 40 is not utilized for the support of shelving 18 or other structural members from the front of the wall. Recess 40 may be utilized for any other desired purpose such as attachment of auxiliary wall system fittings or fixtures thereto. For example, Fig. 9 shows the framing member 12 employed in conjunction with a fitting 114 disposed within the framing member channel. This is merely representative of the types of fittings which may be secured to framing member 12 by a mechanical fastener when utilizing second elongated recess 40.

Elongated recess 38 of framing member 12 is defined by spaced, grooved, elongated recess side walls 50, 52. The grooved side walls are adapted to be engaged by a threaded mechanical fastener such as screw 54, after the cover plate 46 has been removed. It will be appreciated that the screw or other threaded fastener may be screwed in engagement with the grooves of the recess side walls at any desired location along the length of the elongated recess 38 and may be utilized with any suitable bracket or other conventional mechanical contrivance to secure a shelf or other structural member in place.

It may readily be seen that the grooves of the recess side walls 50, 52 of the framing member 12 forms inwardly projecting lips or projections in the area of elongated opening 36. The grooves are utilized to releasably secure an elongated cover plate thereto. One such cover plate is disclosed in Fig. 2 and identified by reference numeral 46. Resilient members 48 project therefrom for selective attachment and detachment from the framing member. This provides and ensures containment of particulates trapped in the recess.

Fig. 3 shows an alternative embodiment framing member, framing member 12A, wherein an elongated recess 56 does not have grooved side walls but rather is comprised of a first, relatively restricted, elongated recess portion 58 and a second, larger, elongated recess portion 60 whereby engagement surfaces 62 are formed.

A screw 64 is positioned in the recess and has an elongated nut element 66 threadedly engaged therewith. The elongated shape of the nut element 66 allows same to be inserted in the recess portion 58 and turned to bring it into alignment with the engagement surfaces 62 (the portion shown in Fig. 3). Turning of the screw tightens the nut into firm engagement with such engagement surfaces. It should be noted that the outer ends of the nut element are knurled to "bite" into the framing member 12A to secure the mechanical fastener into position. In the arrangement illustrated, a bracket 68 is secured to

the framing member 12A by the screw. Projections are formed at the top of the recess to promote securement of a cover plate thereto when framing member 12A does not receive a fastener.

Yet another embodiment of the apparatus is shown in Fig. 4 wherein framing member 12B defines projections 70 extending into recess portion 60B which are received in indents 72 of a nut element 66B.

In the arrangement disclosed in Fig. 5, a framing member 12C defines an elongated recess having a generally arrow-shaped cross-sectional configuration. In this instance the nut element 76 includes two relatively moveable nut element segments 78, 80 which allow insertion of the nut element into the restricted outer recess portion and expansion thereof when positioned in the lower, larger recess portion.

In the Fig. 6, 6A, 6B embodiment, the framing member 12D has recess side walls 84, 86 having grooves somewhat larger than those employed in framing member 12. In this embodiment, the mechanical fastener takes the form of an expansible member 88 which is tightened into position by actuator member 85. When in the position illustrated in Fig. 6, actuator member 90 also serves to support a structural member such as a shelf. Actuator member 85 is generally wedge-shaped and pivotally mounted on a pin extending between the two relatively movable components 87, 89 of member 88. Movement of the actuator member from the solid line position of Fig. 6B to the dash line position will cam the components 87, 89 apart and into firm engagement with the side walls 84, 86.

Fig. 7 illustrates a framing member 96 which may be employed to support two adjacent wall panels (not shown) at the corner of the wall system. Such a framing member is similar to the inside corner framing member disclosed in U.S. Patent No. 4,984,400 except that it employs two outwardly directed elongated recesses 98, 100 engageable by suitable mechanical fasteners and an inner elongated recess 102.

Fig. 8 discloses a frame member 106 which is

WO 93/18250

PCT/US93/01937

7

similar in construction to the outside corner framing member disclosed in U.S. Patent No. 4,984,400, except that framing member 106 defines elongated recesses 108, 110 and 112.

WO 93/18250

8

CLAIMS

1. Support apparatus including a framing member for supporting at least one panel of a wall assembly and for supporting a structural member projecting outwardly from said framing member and said panel, said framing member comprising, in combination:

an elongated body having a front body panel and a pair of legs opposed to one another and having distal ends spaced from said front body panel and defining a channel; and

at least one elongated panel support flange integrally connected to said elongated body and contiguous with said front body panel, said elongated body defining an elongated opening in said front body panel and further defining an elongated recess in at least partial registry with said elongated opening and communicating with said elongated opening, said elongated opening and said elongated recess extending a substantial length along said elongated body, and for receiving and accommodating attachment means, whereby said structural member may be attached to said framing member at a preselected location of a plurality of locations along said elongated body.

2. The support apparatus according to Claim 1 wherein said elongated recess is defined by spaced, grooved, elongated recess side walls.

3. The support apparatus according to Claim 1 wherein said elongated recess includes a first, relatively restricted, elongated recess portion adjoining said elongated opening and a second, larger, elongated recess portion spaced from said first, relatively restricted, elongated recess portion, said first, relatively restricted, elongated recess portion providing communication between said elongated opening and said second, larger, elongated recess portion, said elongated

WO 93/18250

PCT/US93/01937

9

body defining at least one engagement surface engageable by at least a portion of said attachment means when said attachment means is positioned in said elongated recess.

4. The support apparatus according to Claim 1 additionally comprising an elongated cover plate and means for releasably securing said elongated cover plate to said elongated body to cover said elongated opening and said elongated recess.

5. The support apparatus according to Claim 1 wherein said elongated body defines a second elongated recess, said second elongated recess opening to said channel defined by said pair of legs and said front body panel.

6. The support apparatus according to Claim 3 wherein said elongated body defines at least one projection engageable by said attachment means projecting into said second elongated recess portion from said engagement surface.

7. The support apparatus according to Claim 1 wherein said elongated body is configured to support two panels in a corner of said wall assembly.

8. The support apparatus according to Claim 1 additionally including said attachment means and wherein said attachment means is a mechanical fastener selectively attachable to said elongated body and selectively detachable from said elongated body.

9. The support apparatus according to Claim 8 wherein said mechanical fastener includes at least one threaded fastener element.

10. The support apparatus according to Claim 9 wherein said mechanical fastener additionally includes a nut element threadably engageable with said at least one

10

threaded fastener element, said nut element positionable in said elongated recess and engageable with said elongated body when positioned in said recess.

11. The support apparatus according to Claim 10 wherein said nut element has a knurled surface engageable with said elongated body.

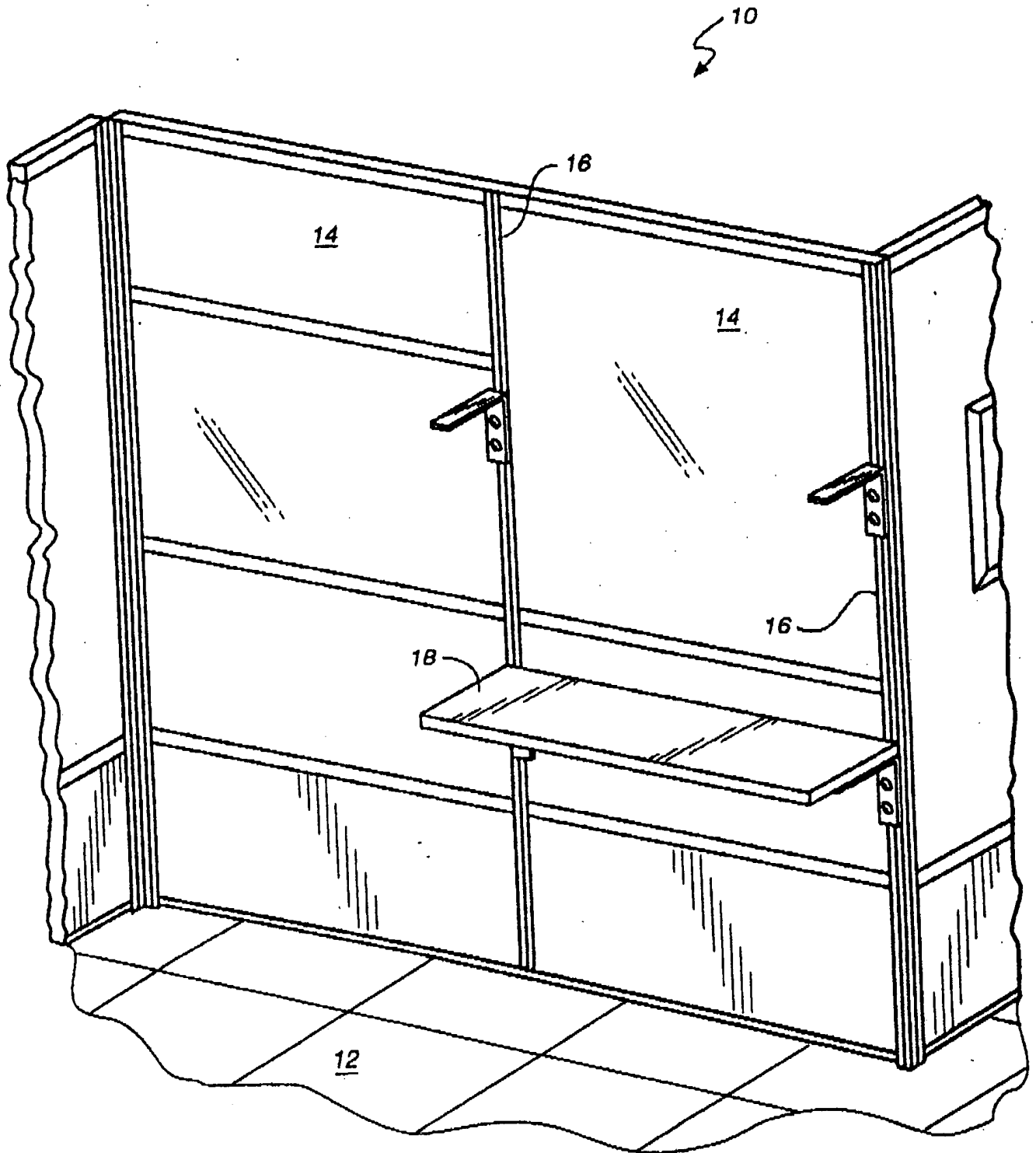
12. The apparatus according to Claim 10 wherein said nut element includes a plurality of relatively moveable nut element segments.

13. The apparatus according to Claim 8 wherein said mechanical fastener includes an expansible member and means for expanding said expansible member to engage the elongated body when said expansible member is positioned in said recess.

WO 93/18250

PCT/US93/01937

1 / 5

**FIG. 1**

WO 93/18250

2 / 5

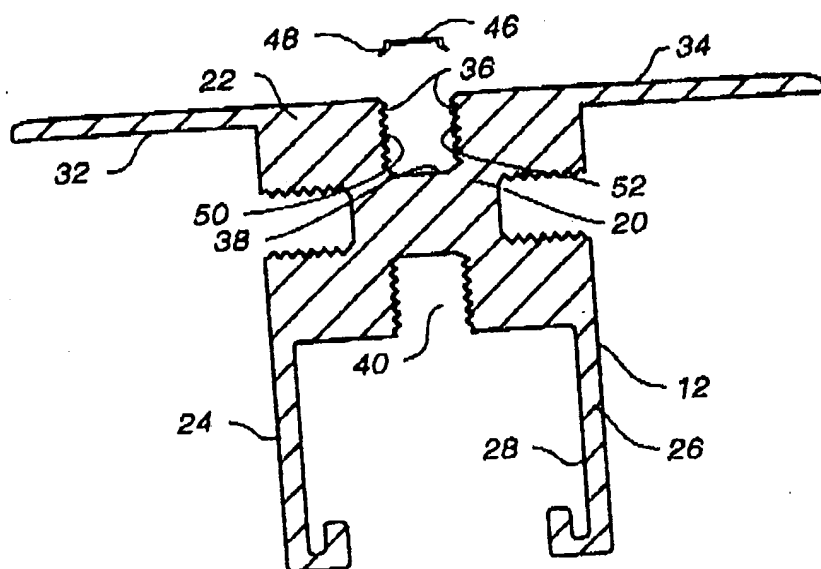


FIG. 2

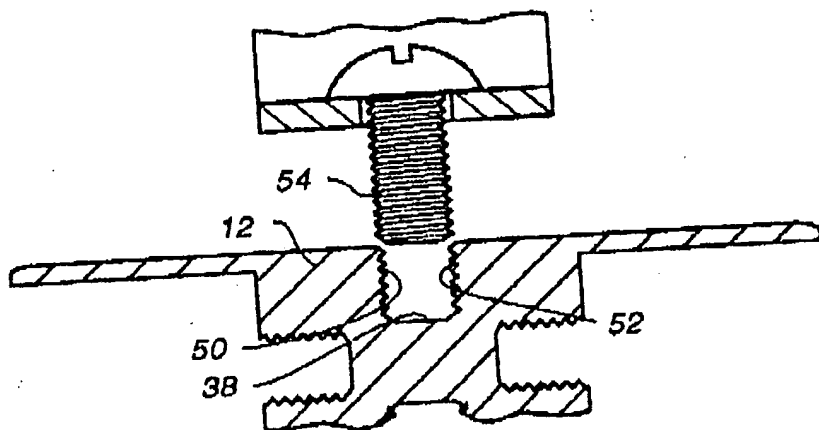


FIG. 2A

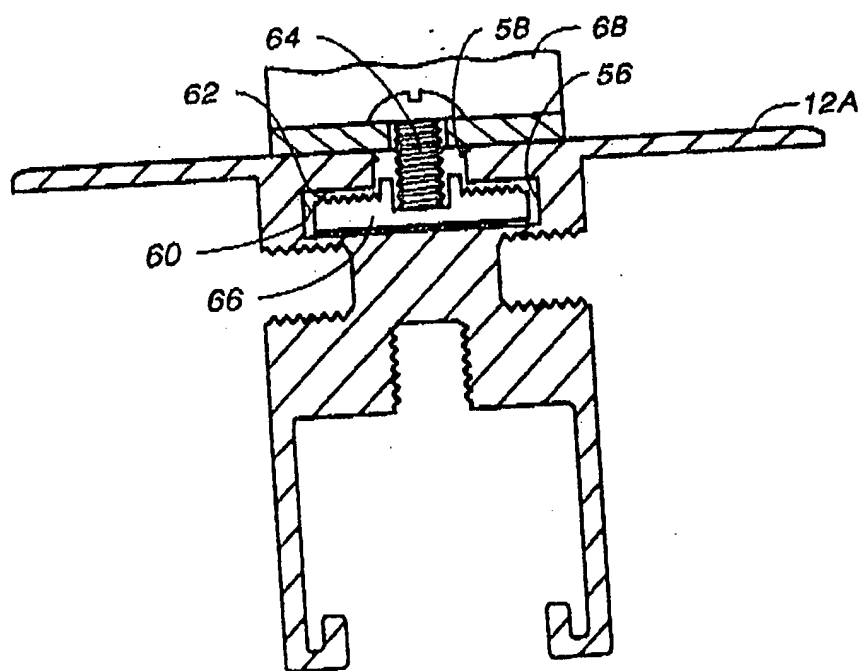
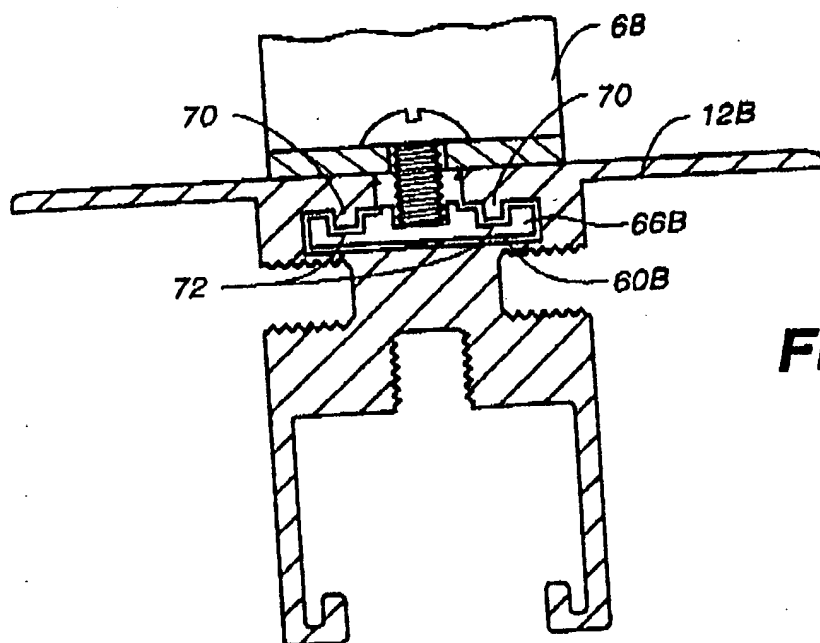
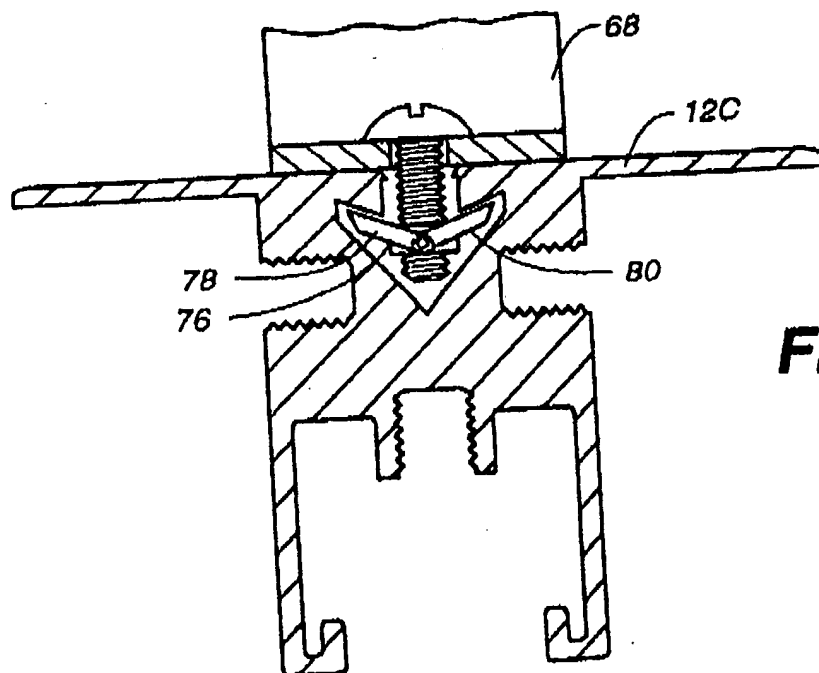


FIG. 3

WO 93/18250

3 / 5

**FIG. 4****FIG. 5**

WO 93/18250

4 / 5

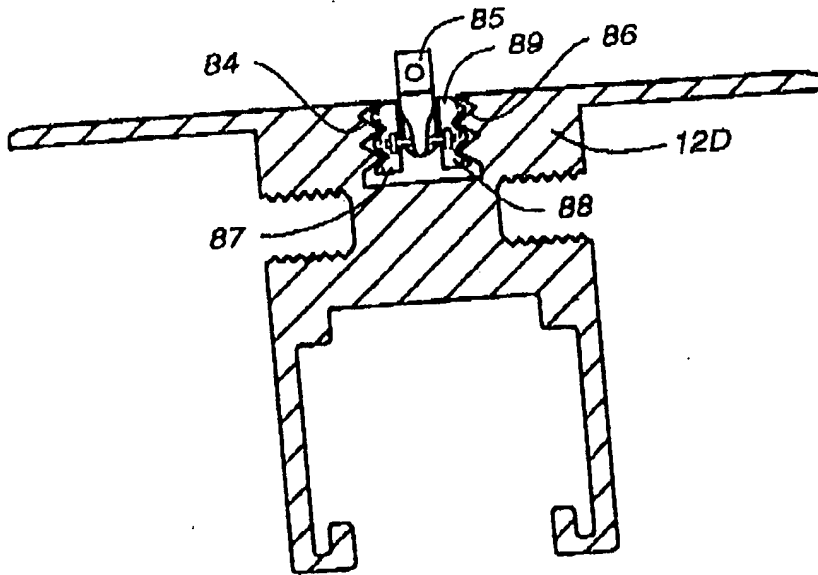


FIG. 6

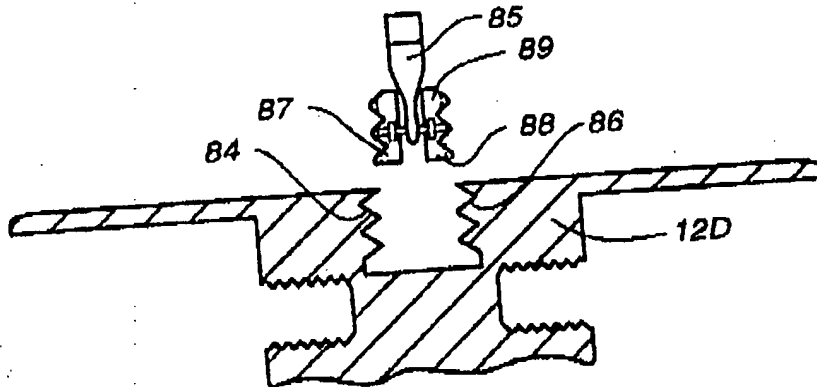


FIG. 6A

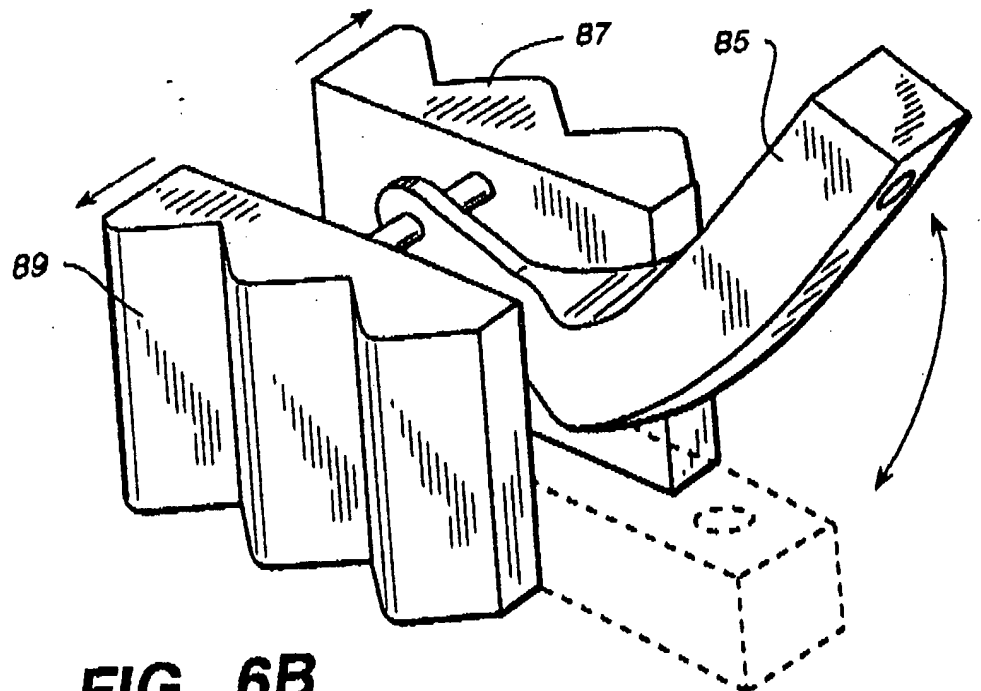
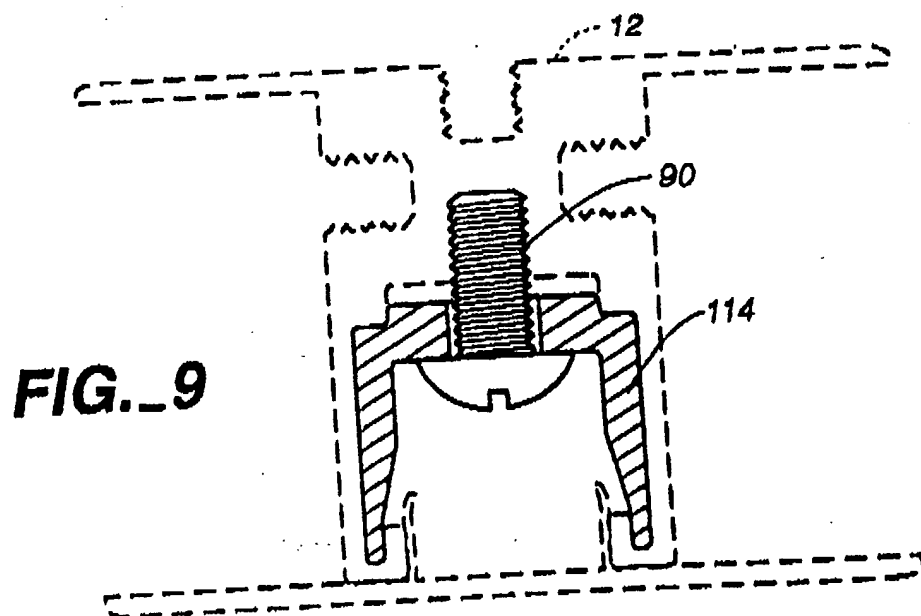
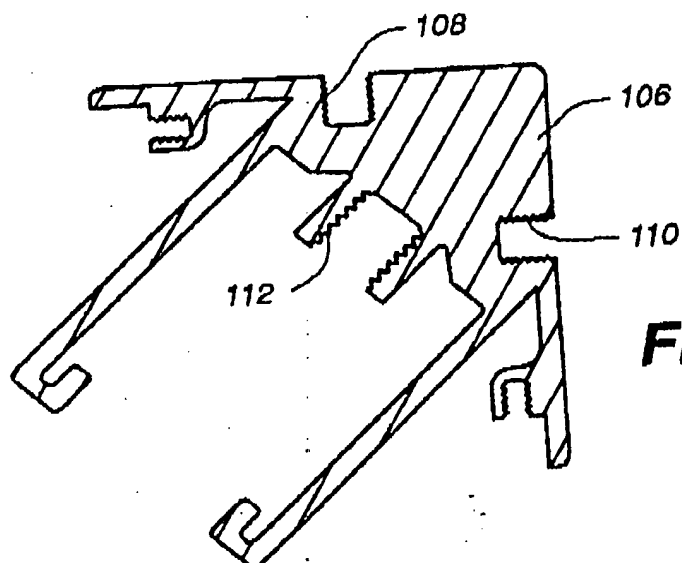
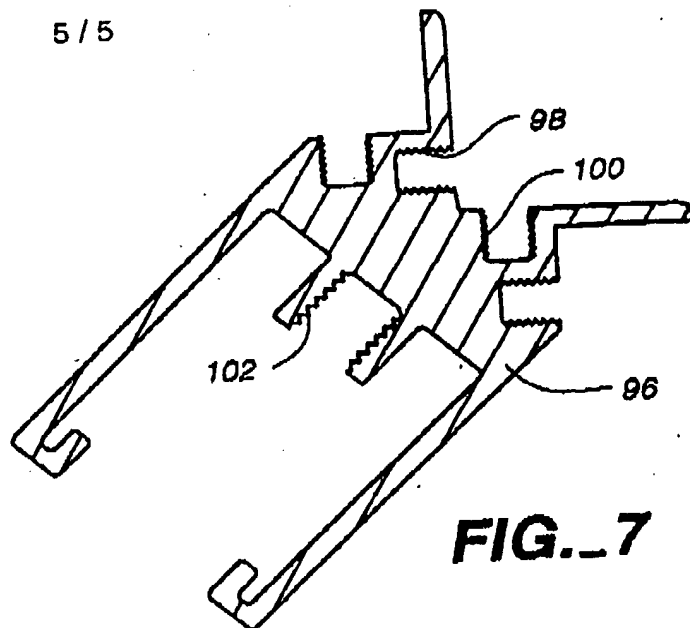


FIG. 6B

WO 93/18250

5 / 5



INTERNATIONAL SEARCH REPORT

International application No.
PCT/US93/01937

A. CLASSIFICATION OF SUBJECT MATTER

IPC(5) : E04H 1/00
US CL : 52/36

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

U.S. : 52/36.4,40,238.1,241,731.5,731.9,775

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US,A, 4,570,390 (Wendt) 18 February 1986 See entire document.	1,2,4,5,8,9
Y		12
Y	US,A, 4,984,400 (Bockmiller) 15 January 1991 See col. 4, lines 14-35.	1,7
Y	US,A, 4,560,130 (Schwartz) 24 December 1985 See col. 4, lines 67-col. 5, line 45.	3,6,7-10, 13
Y	US,A, 4,506,484 (Bartlett et al.) 26 March 1985 See col. 5, lines 27-44.	1,2,8,9,12
Y	US,A, 5,090,170 (Propst) 25 February 1992 see col. 5, line 61-col. 6, line 6.	11

☐ Further documents are listed in the continuation of Box C.

☐ See patent family annex.

- *A* Special categories of cited documents:
document defining the general state of the art which is not considered to be part of particular relevance
- *B* earlier document published on or after the international filing date
- *L* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- *O* document referring to an oral disclosure, use, exhibition or other means
- *P* document published prior to the international filing date but later than the priority date claimed

- *T* Inter document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
- *X* document of particular relevance: the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
- *Y* document of particular relevance: the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
- *Z* document member of the same patent family

Date of the actual completion of the international search
22 APRIL 1993

Date of mailing of the international search report
12 MAY 1993

Name and mailing address of the ISA/US
Commissioner of Patents and Trademarks
Box PCT
Washington, D.C. 20231

Authorized officer
MATTHEW LENO

Telephone No. (703) 305-2168

Facsimile No. NOT APPLICABLE
Form PCT/ISA/210 (second sheet)(July 1992)*

**This Page is Inserted by IFW Indexing and Scanning
Operations and is not part of the Official Record**

BEST AVAILABLE IMAGES

Defective images within this document are accurate representations of the original documents submitted by the applicant.

Defects in the images include but are not limited to the items checked:

- ☐ **BLACK BORDERS**
- ☐ **IMAGE CUT OFF AT TOP, BOTTOM OR SIDES**
- ☐ **FADED TEXT OR DRAWING**
- ☐ **BLURRED OR ILLEGIBLE TEXT OR DRAWING**
- ☐ **SKEWED/SLANTED IMAGES**
- ☐ **COLOR OR BLACK AND WHITE PHOTOGRAPHS**
- ☐ **GRAY SCALE DOCUMENTS**
- ☐ **LINES OR MARKS ON ORIGINAL DOCUMENT**
- ☐ **REFERENCE(S) OR EXHIBIT(S) SUBMITTED ARE POOR QUALITY**
- ☐ **OTHER:** _____

IMAGES ARE BEST AVAILABLE COPY.

As rescanning these documents will not correct the image problems checked, please do not report these problems to the IFW Image Problem Mailbox.